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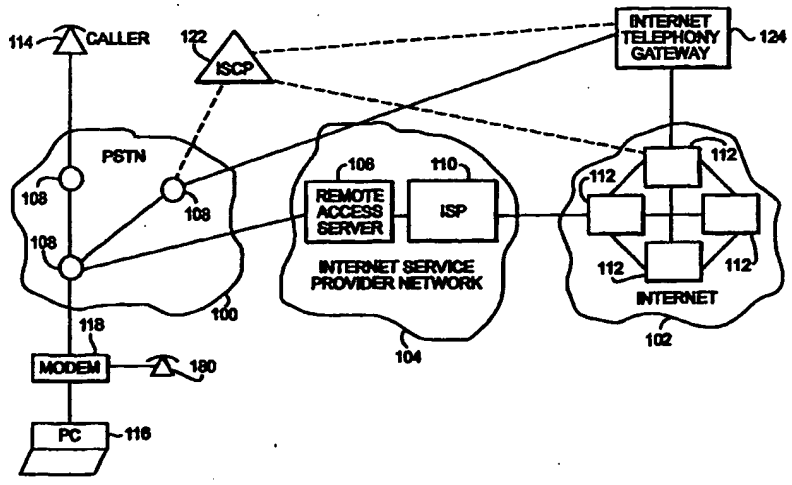


(57) Abstract

Methods and apparatus for providing a "never busy" telephony service to internet users is described. Internet users register their use with, for example, an internet telephony gateway, an intelligent network service control point ("ISCP"), or some other network directory system. Telephone calls placed to the user while the user is communicating with the internet are processed accordingly. The ISCP instructs the switch to route a call for the user to the internet telephony gateway if the user has registered. The internet telephony gateway establishes an internet based telephone call to the user to alert the user to the phone call.

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# SYSTEMS AND METHODS FOR INTERNET ENABLED SERVICES

## Cross-Reference to Related Applications

This application claims the benefit of U.S. Provisional Application No. 60/068,592, filed June 4, 1997, the contents of which are hereby incorporated by reference.

This invention is related to U.S. Patent Application Serial No. 09/082,243, filed on May 20, 1998, the contents of which are hereby incorporated by reference.

## Technical Field

The present invention relates generally to internet telephony services, and more particularly, to systems and methods for providing a "never busy" service.

## Background Art

Today's internet users typically communicate with an internet via their residential or commercial telephone line. This line typically provides only a single communication path at any one time. Thus, a user connected to an internet cannot concurrently receive a telephone call because the line is busy with the internet communication, and callers attempting to communicate with the internet user receive a busy signal or are connected to the user's voice mail. The inability to receive telephone calls while communicating with the internet leaves internet users greatly disadvantaged because they can miss important telephone calls.

Thus, it is desirable to have systems and methods for alerting internet users to an incoming telephone call and to permit access to that call without interrupting an internet session. Additional objectives, features, and advantages of the invention will be set forth in the description which follows, and

in part will be apparent from the description, or may be learned by practice of the invention. The objectives and other advantages of the invention will be realized and attained by means of the instrumentalities and combinations particularly pointed out in the written description and appended claims hereof as well as the appended drawings.

## Disclosure of the Invention

To achieve these and other advantages and in accordance with the purposes of the invention, as embodied and broadly described, the invention includes a method in a telephony network connected to an internet, of informing an internet user of an awaiting telephone call. The method comprises the steps of registering a user's communication with the internet. In response to a telephone call for the user, the method determines whether the user is communicating with the internet; and if so, transfers the call to the user via the internet.

Another method of the invention comprises the steps of registering a user's communication with the internet at an internet telephony gateway at about the time the user originates the communication. In response to a telephone call for the user, the method then queries an intelligent network service control point on how to process the call. The intelligent network service control point sends a message to the internet telephony gateway to determine whether the user is currently communicating with the internet; and if so, routes the call to the internet telephony gateway for delivery to the user.

Another method of the invention comprises the steps of registering a user's communication with the internet at an intelligent network service control point at about the time the user originates the communication. In response to a telephone call for the user, the method queries the intelligent network service control point on how to process the call. The intelligent network service control point then determines whether the user is currently communicating with the internet; and if so, routes the call to an internet telephony gateway for delivery to

the user. In an alternative method, the registration is performed by any suitable network directory system.

The invention further includes a method executed by an intelligent service control point of, informing an internet user of an awaiting telephone call, comprising the steps of registering a user's communication with the internet, in response to a trigger from a switch indicating that the user's telephone line is busy, determining whether the user is currently communicating with the internet; and if so, instructing the switch to route the call to the internet for delivery to the user.

The invention also includes a network comprising a telephone network; an internet connected to said telephone network; a means for registering a user's communication with the internet; a means responsive to a telephone call for the user for determining whether the user is communicating with the internet; and a means for transferring the telephone call to the internet if the user is registered.

The invention further includes a network comprising a telephone network; an internet connected to said telephone network; an internet telephony gateway including means for registering a user's communication with the internet; and an intelligent network service control point, including means for sending a message to the internet telephony gateway to determine whether the user is currently communicating with the internet, and means for instructing a switch to transfer a call to the user when the internet telephony gateway determines that the user is registered.

The invention also includes an intelligent network service control point, comprising a means for sending a message to an internet telephony gateway on a separate registration directory to determine whether a user is currently communicating with an internet connected to the intelligent network service control point; and a means for instructing a switch to transfer a call to the

user to the internet telephony gateway or the registration directory when the user is currently communicating with the internet.

In addition, the invention includes an intelligent network service control point, comprising a means for determining whether a user is currently communicating with an internet connected to the intelligent network service control point; and a means for instructing a switch to transfer a call to the user to an internet telephony gateway when the user is currently communicating with the internet.

It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are not intended to provide further explanation of the invention as claimed.

## Brief Description of the Drawings

Fig. 1 is a block diagram of a network for providing "never busy" services in accordance with one embodiment of the invention;

Fig. 2 is a call processing flow diagram for providing a "never busy" service in accordance with one embodiment of the present invention;

Fig. 3 is a call processing record for execution by an intelligent service control point in accordance with one embodiment of the present invention;

Fig. 4 is a call flow diagram for providing a "never busy" service in accordance with an alternative embodiment of the present invention; and

Fig. 5 is a call processing record for execution by an intelligent service control point in accordance with an alternative embodiment of the present invention.

## Best Mode for Carrying out the Invention

Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying

drawings. Wherever possible, the same reference numbers will be used throughout the drawings to refer to the same or like parts.

The following description of the preferred embodiment of the present invention is only exemplary of the present invention. The present invention is not limited to these implementations, but may be realized by other implementations.

The term "internet" as used in this application refers to any network, proprietary or commercial, which utilizes any packet-based communication protocol, including, for example, today's commercial Internet.

Fig. 1 is a block diagram of a network for implementing services in accordance with one embodiment of the present invention. As shown, public switched telephone network ("PSTN") 100 is connected to an internet 102 by an internet service provider ("ISP") network 104. ISP network 104 includes a remote access server 106 that preferably interfaces with one or more switches 108 of the PSTN 100. ISP network 104 also includes one or more ISP routers 110 which interface with internet nodes 112.

A conventional telephone based caller 114 can place conventional voice calls through the PSTN 100. PC users 116 can dial into the internet 102 via a modem 118, which can also handle conventional calls from a telephone 120.

In accordance with the present invention, an intelligent network service control point ("ISCP") 122 is connected to one or more switches 108 of the PSTN 100. ISCP 122 preferably comprises a Bellcore ISCP® platform architecture to create and execute network services, and includes, for example, the SPACE® and MSAP® applications. The ISCP 122 processes customer records and/or service records in response to queries from PSTN switches 108 and instructs switches 108 on how to handle and route calls.

In this embodiment of the invention, the service further includes an internet telephony gateway ("ITG") 124 connected via data links to the ISCP 122, one or more switches 108 of the PSTN 100 and one or more nodes 112 of the

internet 102. ITG 124 preferably provides a communication path for voice signals into the internet 102.

Fig. 2 shows a call flow diagram for the system of Fig. 1 in accordance with one embodiment of the present invention. An internet telephony client or "user" as referred to in Fig. 2 refers to, for example, a subscriber with access to the system via PC 116, modem 118, and/or telephone 120. Initially, that user establishes an internet communication by calling into the internet service provider 110 (step 202). In this embodiment, when a connection to an internet service provider is established by PSTN 100, the system registers that connection with the ITG 124 (step 204). The registration may be performed, for example, by an application running on the user's PC 116 or at an ISP server. Each time the user connects to the internet, the application sends the user's address and any other appropriate information to the ITG 124, or other network element that may perform the registration.

After the user registers with the ITG 124, assume a call comes in for that user from another caller 114 (step 206). That call comes in to one of the PSTN switches 108 (also referred to as a SSP). The switch 108 determines at that time that the user's line is busy because the user is communicating with the ISP network 124. In accordance with one embodiment of the invention, the switch queries the ISCP 122 for an instruction on how to process the call (step 208). ISCP 122 then executes a call processing record to provide the instruction (step 210).

An example of such a call processing record is shown in Fig. 3. As shown, in response the busy signal query (step 300) from the PSTN switch 108, ISCP 122 executes a send-to-resource with play application node (step 302). This node sends a request to the ITG 124 for a routing number (step 212, Fig. 2). The request includes the user's telephone number, which the ITG 124 uses to determine if the user is currently registered, i.e., on line with the internet. The

ISCP 122 then determines the result of the send-to-resource application query (step 304) depending on the information returned by the ITG 124 (step 214, Fig. 2). The query is considered a failure (step 306) if the user is not registered or if the ITG 124 has no available resources to handle the query. The result is successful if the ITG 124 returns its routing number to the ISCP 122 (step 308).

Referring back to Fig. 2, the ISCP 122 transmits the instructions based on the result from the ITG 124 to the switch 108 (step 216). The remaining call processing shown in Fig. 2 assumes that the user is registered with the ITG 124. In particular, the switch 108 connects the caller 114 to the ITG 124 (step 218). The ITG 124 can then send a signal to the user via the internet connection indicating that a call is waiting for the user (step 220). For example, the ITG 124 can send a signal to ring the user's telephone 120 or send data to display a message on the user's PC 116. The user can then answer the call if desired through internet telephony client software running on the user's PC.

In the event that the ISCP 122 determines that the user is not registered with the ITG 124, the switch 108 of PSTN 100 may handle the call in any conventional manner of telephone service. For example, the switch may simply send a busy tone to the caller 114, or it may direct the call 114 into the user's voice mail. Or, the switch 108 may send a call waiting indication to the user in accordance with know techniques.

The internet based telephone call established by the ITG 124 through the internet may use any internet protocol necessary to achieve the connection, including, for example, the H.323 protocol.

Fig. 4 shows an alternative embodiment of the invention where the ISCP 122 acts as the registration service for internet communications. This differs from the above embodiment where the internet telephony gateway 124 performed the registration. As show, initially, the user establishes an internet based communication via the ISP network 104 (step 400). In this embodiment, when the

internet based communication is established, the user registers with the ISCP 122 (step 402). For example, switches may be configured such that each time they establish a connection to a ISP network 104, they send an appropriate "registration" trigger and the user's telephone number to the ISCP 122. The ISCP 122 will recognize the registration trigger and store the user's address with information indicating the user's existing access into the internet (step 404).

When a caller 114 calls the user (step 406), the switch 108 cannot complete the call to the user's busy line, so it queries the ISCP (step 408). ISCP 122 executes a call processing record (step 410), as shown for example in Fig. 5. In response to a "busy trigger" from the switch (step 500), the ISCP determines whether the user is registered (step 502). If not, the ISCP may send a conventional call processing instruction to the switch (step 504). Again, these instructions may include send a busy signal or connect the caller to the user's voice mail. If, however, the user is registered, the ISCP executes the same send-to-resource with play application (step 506) and send-to-resource result (step 508) nodes. Again, if the result is a failure, processing continues at step 504. However, if the result is successful, i.e. the ITG 124 has resources to process the call, ISCP 122 instructs the switch to route the call to the ITG 124, giving the switch 108 the ITG routing number (step 510).

Referring back to Fig. 4, steps 412, 414, and 416 are similar to steps 212, 214, and 216 in Fig. 2. The ISCP 122 instructs the switch on how to process the call (step 416). Assuming a successful result from the ITG 124, ISCP 122 instructs the switch to route the call to the routing number of the ITG 124 to establish a connection (step 418). The ITG 124 then informs the user of the existing telephone call as described above (step 420). Again, if the result comes back a failure, the ISCP may instruct the switch to handle the call in a more conventional manner, either by sending, for example, a busy signal, or forwarding the call to a voice mail.

While there has been illustrated and described what are at present considered to be preferred embodiments and methods of the present invention, it will be understood by those skilled in the art that various changes and modifications may be made, and equivalents may be substituted for elements thereof without departing from the true scope of the invention.

In addition, many modifications may be made to adapt a particular element, technique or implementation to the teachings of the present invention without departing from the central scope of the invention. Therefore, it is intended that this invention not be limited to the particular embodiments and methods disclosed herein, but that the invention include all embodiments falling within the scope of the appended claims.

Claims

1. In a telephony network connected to an internet, a method of informing an internet user of an awaiting telephone call, comprising the steps of:

registering a user's communication with the internet;

in response to a telephone call for the user, determining whether the user is communicating with the internet; and

if so, transferring the call to the user via the internet.

2. In a telephony network connected to an internet, a method of informing an internet user of an awaiting telephone call, comprising the steps of:

registering a user's communication with the internet at an internet telephony gateway at about the time the user originates the communication;

in response to a telephone call for the user, querying an intelligent network service control point on how to process the call;

sending a message from the intelligent network service control point to the internet telephony gateway to determine whether the user is currently communicating with the internet; and

if so, routing the call to internet telephony gateway for delivery to the user.

3. In a telephony network connected to an internet, a method of informing an internet user of an awaiting telephone call, comprising the steps of:

registering a user's communication with the internet at an intelligent network service control point at about the time the user originates the communication;

in response to a telephone call for the user, querying the intelligent service control point on how to process the call;

determining at the intelligent network service control point whether the user is currently communicating with the internet; and

if so, routing the call to an internet telephony gateway for delivery to the user.

4. In a telephony network connected to an internet, a method of informing an internet user of an awaiting telephone call, comprising the steps, executed by an intelligent network service control point, of:

registering a user's communication with the internet;

in response to a trigger from a switch indicating that the user's telephone line is busy, determining whether the user is currently communicating with the internet; and

if so, instructing the switch to route the call to the internet for delivery to the user.

5. A network comprising:

a telephone network;

an internet connected to said telephone network;

means for registering a user's communication with the internet;

means responsive to a telephone call for the user for determining whether the user is communicating with the internet; and

means for transferring the telephone call to the internet if the user is registered.

6. A network comprising:

a telephone network;

an internet connected to said telephone network;

an internet telephony gateway including means for registering a user's communication with the internet;

an intelligent network service control point, including means for sending a message to the internet telephony gateway to determine whether the user is currently communicating with the internet, and means for instructing a switch to transfer a call to the user when the internet telephony gateway determines that the user is registered.

7. An intelligent network service control point, comprising:

means for sending a message to an internet telephony gateway to determine whether a user is currently communicating with an internet connected to the intelligent service control point; and

means for instructing a switch to transfer a call to the user to the internet telephony gateway when the user is currently communicating with the internet.

8. An intelligent network service control point, comprising:

means for determining whether a user is currently communicating with an internet connected to the intelligent service control point; and

means for instructing a switch to transfer a call to the user to an internet telephony gateway when the user is currently communicating with the internet.

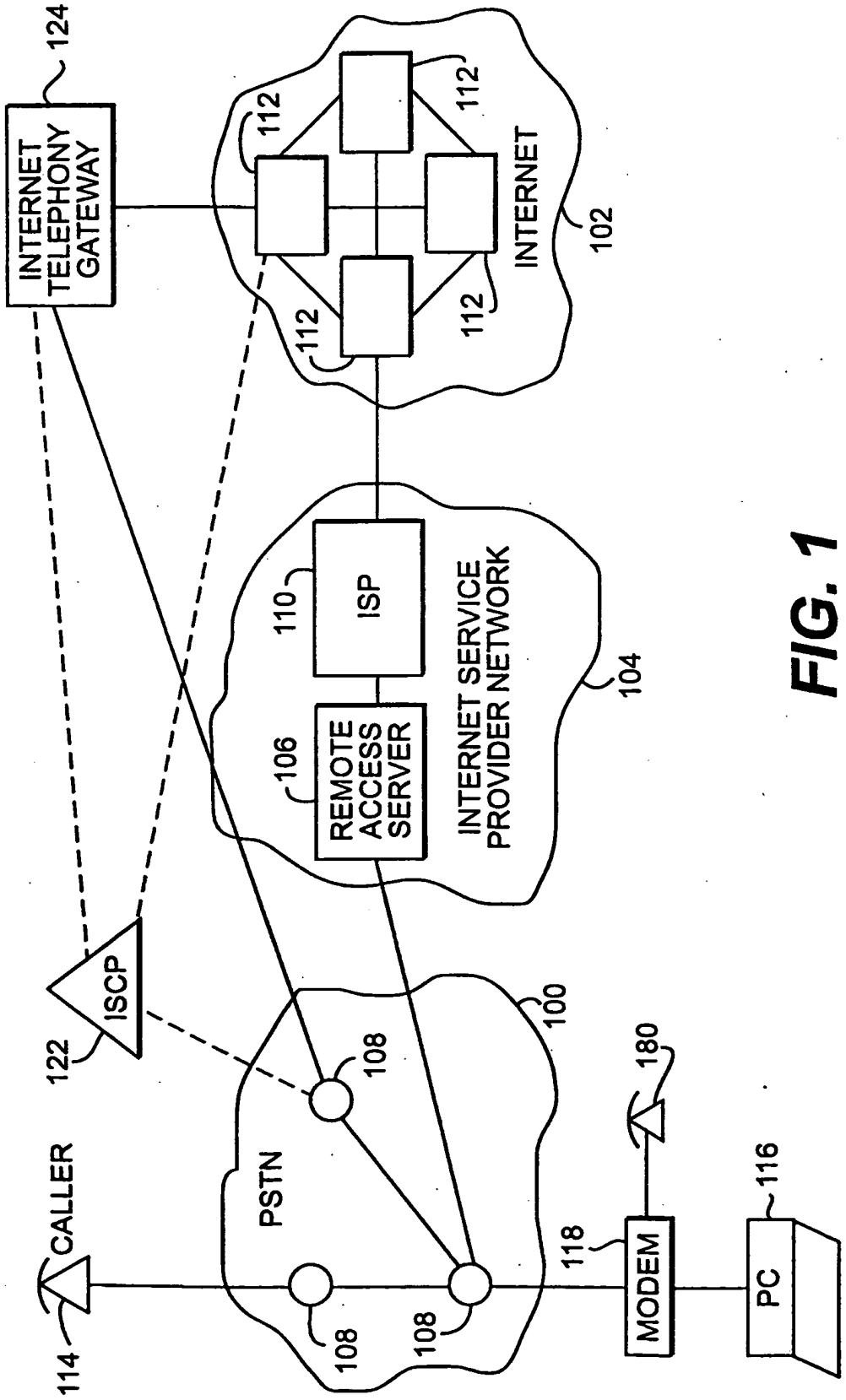
INTERNET TELEPHONY GATEWAY
124
INTERNET
102
112
112
112
112
ISP
110
REMOTE ACCESS SERVER
106
INTERNET SERVICE PROVIDER NETWORK
104
ISCP
122
PSTN
100
108
108
108
CALLER
114
180
MODEM
118
PC
116

FIG. 1

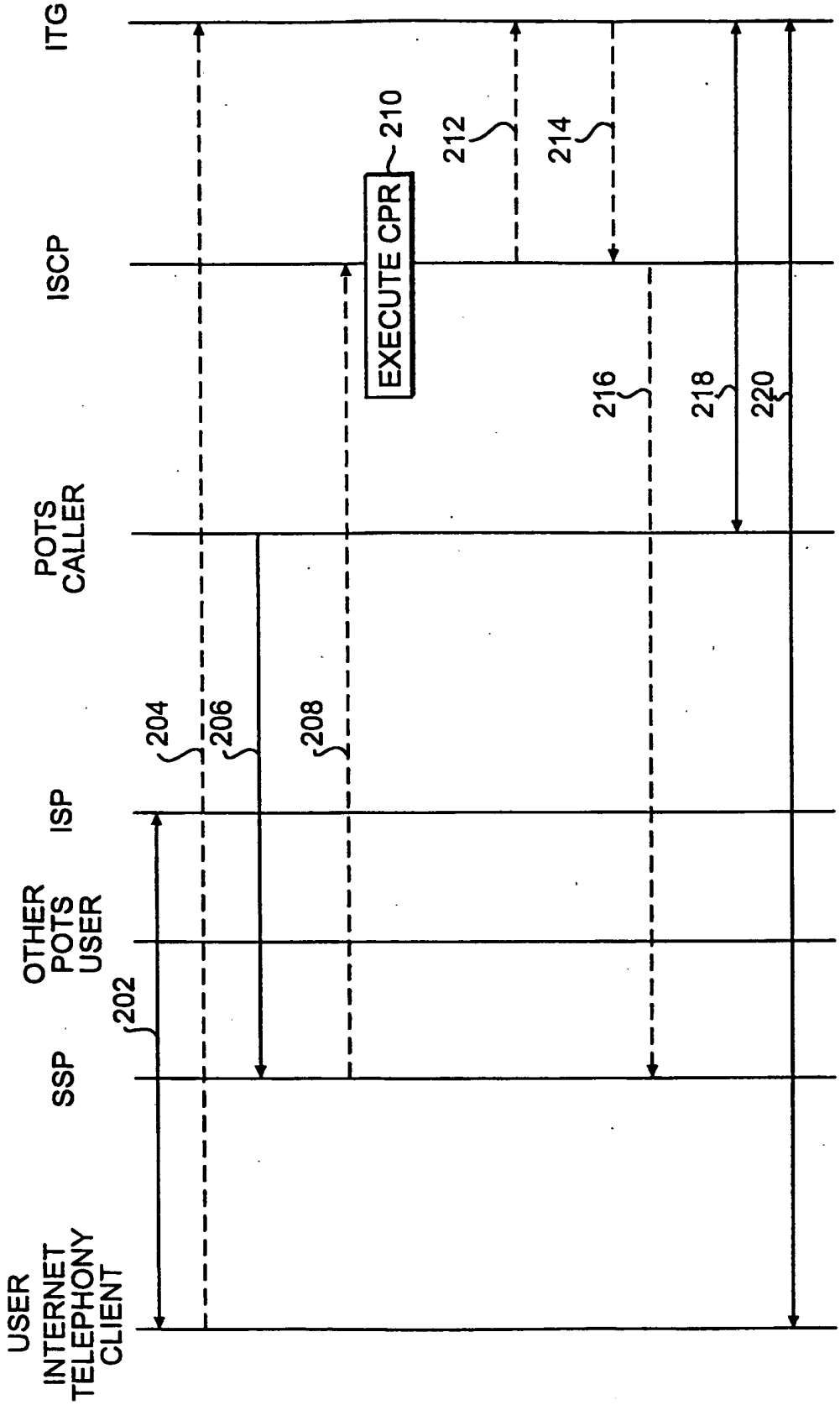
ITG
ISCP
POTS CALLER
ISP
OTHER POTS USER
SSP
USER INTERNET TELEPHONY CLIENT
EXECUTE CPR
210
212
214
216
218
220
202
204
206
208

FIG. 2

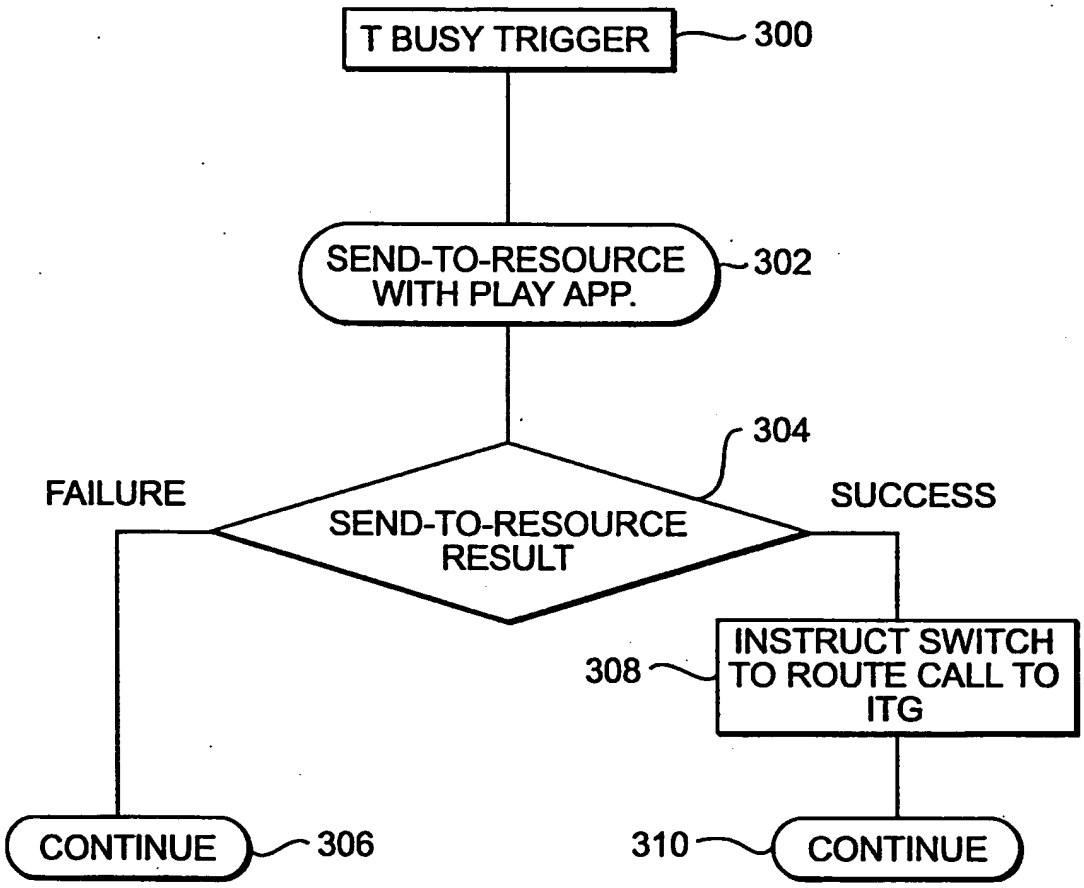
T BUSY TRIGGER
300
SEND-TO-RESOURCE WITH PLAY APP.
302
304
FAILURE
SEND-TO-RESOURCE RESULT
SUCCESS
308
INSTRUCT SWITCH TO ROUTE CALL TO ITG
CONTINUE
306
310
CONTINUE

FIG. 3

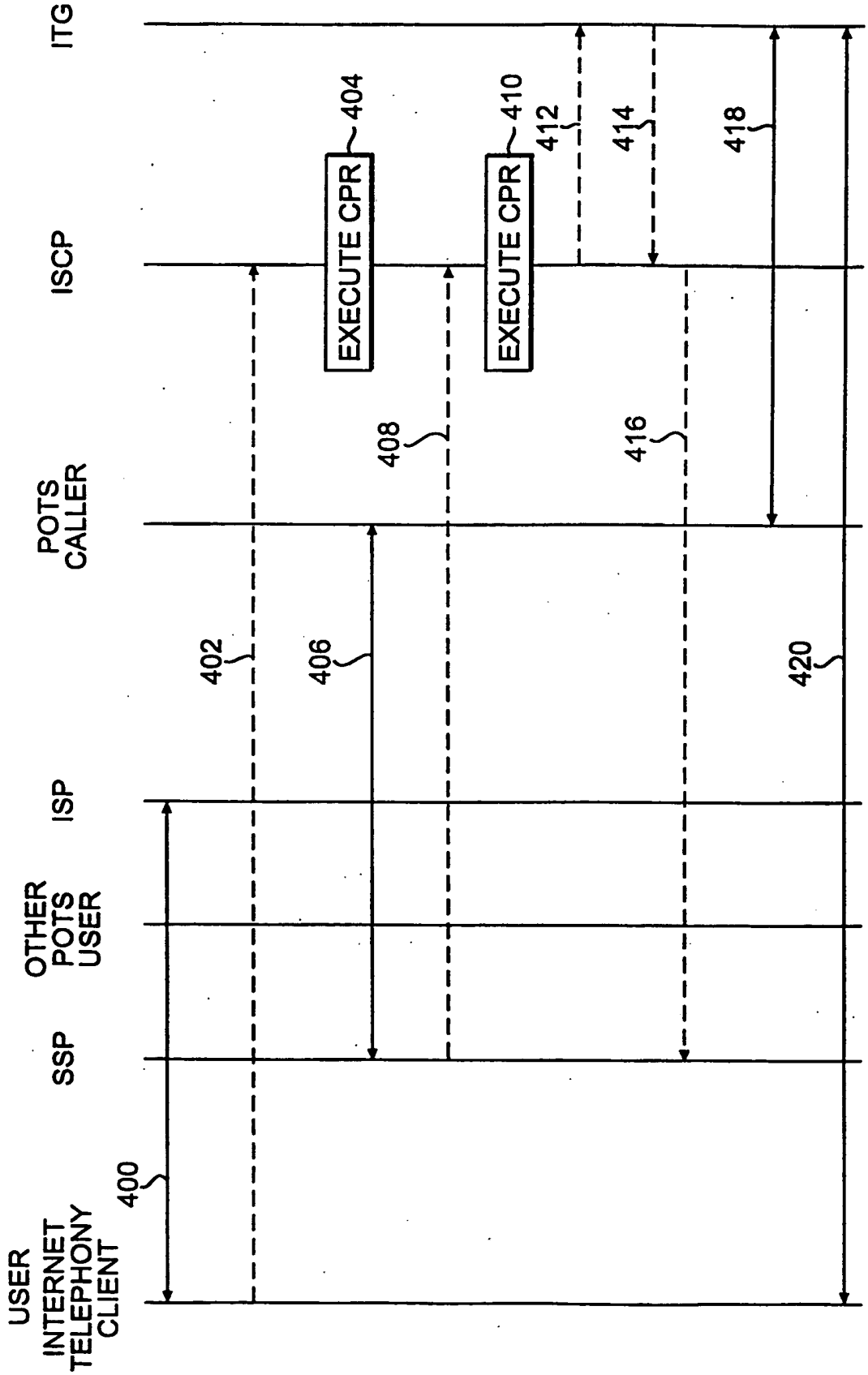
ITG
ISCP
POTS CALLER
ISP
OTHER POTS USER
SSP
USER INTERNET TELEPHONY CLIENT
EXECUTE CPR
EXECUTE CPR
400
402
404
406
408
410
412
414
416
418
420

FIG. 4

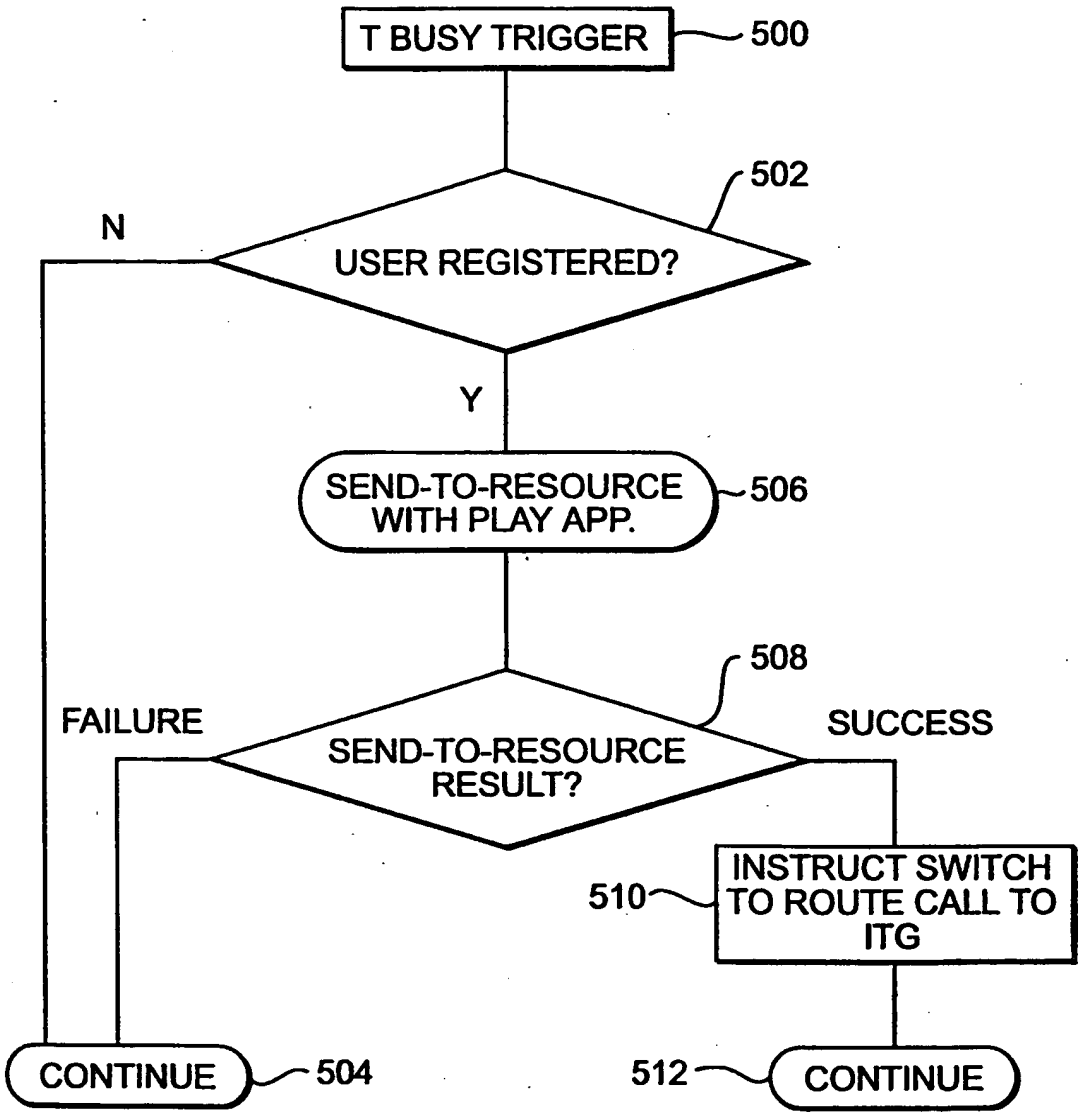
T BUSY TRIGGER
500
502
USER REGISTERED?
N
Y
SEND-TO-RESOURCE WITH PLAY APP.
506
508
SEND-TO-RESOURCE RESULT?
FAILURE
SUCCESS
INSTRUCT SWITCH TO ROUTE CALL TO ITG
510
CONTINUE
504
512
CONTINUE

FIG. 5